Denver Law Review

Volume 46 | Issue 2 Article 5

April 2021

Technology, Ocean Management, and the Law of the Sea: Some Current History

Edward Miles

TECHNOLOGY, OCEAN MANAGEMENT, AND THE LAW OF THE SEA: SOME CURRENT HISTORY

BY EDWARD MILES*

In this article Mr. Miles discusses aspects of the recent history of ocean law which reveal the impact of technological development on the processes of developing international standards to govern use and management of the oceans. More specifically he demonstrates how technology considerations have influenced the types of jurisdictional claims over coastal waters which have been made by various countries. The present state of ocean technology is briefly outlined and discussed in terms of its implications for the future development of ocean law, and the author notes that the law of outer space will be shaped in a similar way by considerations of technological development.

INTRODUCTION

THIS paper is intended primarily for the nonspecialist on the law of the sea, and it will discuss some of the salient problems in this branch of international law which have been considered since the time of the League of Nations Codification Conference of 1930.

The major problems discussed concern the resolution of conflicting claims of national jurisdiction over the ocean spaces which are contiguous to particular nation-states. The considerations which motivate a particular nation to claim a 3 or a 6 or a 12-mile territorial sea, and the considerations which are relevant to the regulation of ocean uses beyond the boundaries set by the traditional concepts of "territorial sea" have changed drastically in recent years. The most significant of these changes have been recent innovations in marine technology. The problems which have been generated by these changes have come to the forefront of international attention. It is the purpose of this paper to provide both a summary of these current problems in the law of the sea and a guide to the more specialized literature in which these problems are discussed in more detail.

In their monumental work on the law of the sea,[1] Professors McDougal and Burke have pointed out that this phenomenon of international ocean management really reflects three basic processes vis-a-vis the human use of the oceans. At the highest level of general-

* Assistant Professor, Graduate School of International Studies, University of Denver; B.A., M.A., Ph.D.

[1] M. MCDOUGAL & W. BURKE, THE PUBLIC ORDER OF THE OCEANS (1962).

ity these are: (a) The process of interaction on and in the oceans among all participants; (b) The process of claim arising out of these activities; and (c) The process of authoritative decision to resolve contending claims.[2]

These processes will be examined, paying particular attention to the relationship between them. More specifically it will be seen that the actual and possible uses of the oceans, as viewed from the perspective of each country's economic and political situation, have determinative effects on the processes of claim and authoritative decision.

I. The Impact of Technological Development

The extent to which a country is able to use the ocean as a resource is dependent upon the state of that country's technological and economic development. Interaction on or in the oceans among nation-states would indeed be impossible without some minimum degree of development in marine technology. It is therefore not unexpected that rapid advances in marine technology would have a substantial effect upon the entire process of developing international standards to govern the use of the oceans.

During the last six years, and particularly within the last five, there has been considerable ferment on national, regional, and global levels of questions concerning the exploration and exploitation of the oceans. This ferment is a function of several factors, the major one of which appears to have been the continuing advance in marine technology, which has had a major impact on the national security of nation-states, as well as on the economic potential of ocean exploitation.[3]

Marine technology as it has existed up to the present time has facilitated five kinds of human uses of the ocean. These are for (a) transportation and communication, (b) food resources, (c) mineral resources, (d) national security, and (e) recreation. They have involved essentially two-dimensional uses of the ocean, but advances in technology have now placed us on the threshold of the third dimension — depth. The inefficiency and dangers of operating at or near the air-sea interface are being significantly reduced, if not eliminated, and for the first time the exploitation of the deep ocean

[2] *Id.* ch. 1.

[3] See the comprehensive estimates published in Committee on Oceanography of the National Academy of Sciences/National Research Council, [hereinafter cited as NAS/NRC] Economic Benefits from Oceanographic Research (Pub. No. 1228, 1964).

floor is a distinct possibility. In addition to this, we have begun to pay increasing attention to the interaction between the atmosphere and the oceans with a view toward expanding our knowledge of weather and climate and the possibilities of exercising some control upon them.[4]

This increasing technological sophistication has changed the order of importance of possible conflict confronting participants within the international maritime system. Through 1960, the major problem was the limit of the territorial sea as it related to the problem of jurisdiction over coastal fisheries. In 1969, the major problem concerns the limits of the continental shelf and jurisdiction over the ocean floor beyond the shelf.

During the early international conferences concerning national dominion over adjacent seas, nations with limited technological resources demanded large limits subject to their sovereign control in order to prevent their coastal fisheries from being exploited by distant nations with technologically superior fishing fleets. The technologically advanced nations, on the other hand, wanted to protect distant international waters, which they were capable of exploiting, from encroachments by the coastal state.

Throughout the many conferences on the subject of national dominion over adjacent seas during the early years, progress was made toward establishing uniform international norms, but no satisfactory agreement was ever adopted. However, the recent developments in technology have opened up new areas for national exploitation including the sea bottom adjacent to the coast and the ocean depths beyond. This new capacity to reach the ocean bottom has shifted the debate from the monopoly of coastal fishing to entirely new problems unknown before this decade. As the capacity to reach these new depths increases, the jurisdictional interests of adjacent nations increase as well, and once again the conflict between these expanding interests has brought the issue of ocean management in its broadest implications to the forefront of international concern. These issues became the focus of the United Nations General Assembly debates on the Resources of the Sea in the fall of 1966,[5] and the Maltese *note verbale* of August 18, 1967, proposing inter-

[4] *See* NAS/NRC, INTERACTION BETWEEN THE ATMOSPHERE AND THE OCEANS (Pub. No. 983, 1962); HOUSE COMM. ON SCIENCE AND ASTRONAUTICS, SPACE AND THE WEATHER, H.R. REP. NO. 2561, 87th Cong. 2nd Sess. (1962); W. Sewell, Human Dimensions of the Atmosphere, Feb. 1968 (Draft Report to the National Science Foundation, Program on Applications Analysis, National Center for Atmospheric Research, Boulder, Colorado).

[5] U.N. Doc. A/OR/21/C.2/SR (1966), at 1062-65.

national control of the ocean floor "beyond present limits of national jurisdiction."[6]

The problems generated by the expansion of these national jurisdictional interests may be pointed out by comparing one of the earlier conferences on the law of the sea with some of the more recent conferences.

II. Salient Problems in the Law of the Sea Since 1930

At this time a review of three attempted codifications of the law of the sea — The Hague Codification Conference of 1930, sponsored by the League of Nations, and the United Nations Geneva Conferences of 1958 and 1960 — will reveal quite clearly the processes of claim and authoritative decision, and will show how these processes have been affected by expanding jurisdictional interests. We should remember, however, that the three attempts at codification took place in two different international organizations and inevitably reflect the larger structures of these systems. For instance, while it is true that norms which systematize and regulate activities of competing participants on the oceans have historically reflected the prevailing interests and capabilities of the major nation-states, particularly under the League of Nations, since 1955 minor members of the international system, concomitant with their increased role in the United Nations General Assembly, have been effective in challenging existing norms and influencing the emerging law of the sea in such a way as to be responsive to their own interests.[7]

[6] U.N. Doc. A/6695 (Aug. 18, 1967). For summaries of recent developments in marine technology and the challenges they pose, see *e.g.*, W. Burke, Ocean Sciences, Technology, and the Future International Law of the Sea (1966); National Council on Marine Resources and Engineering Development, Marine Science Affairs — A Year of Transition (1967); President's Science Advisory Committee, Panel on Oceanography, Effective Use of the Sea (1966); W. Chapman, The State of Ocean Use Management, Apr. 24, 1967 (unpublished paper presented to the 2d Session of the FAO Committe on Fisheries, Rome).

[7] For reports and analyses of the Geneva Conferences, See Burke, *Some Comments on the 1958 Conventions*, American Society of International Law [hereinafter cited as ASIL] Proceedings, 1959, 197-206; Dean, *The Law of the Sea Conference, 1958-1960, and Its Aftermath*, in The Law of the Sea, 244-64 (L. Alexander ed.) [hereinafter cited as Alexander (1967)]; Dean, *Achievements at the Law of the Sea Conference*, ASIL Proceedings, 1959, at 186-97; Friedheim, *Factor Analysis as a Tool in Studying the Law of the Sea*, in Alexander (1967), at 47-70; Herrington, *The Convention on Fisheries and Conservation of Living Resources, Accomplishments of the 1958 Geneva Conference*, in Alexander (1967), at 26-35; McDougal & Burke, *supra* note 1; Neblett, *The 1958 Conference on the Law of the Sea: What Was Accomplished*, in Alexander (1967), at 36-46; Dean, *The Second Geneva Conference on the Law of the Sea*, 54 Am. J. Int'l Law 751-89 (1960); Dean, *The Geneva Conference on the Law of the Sea: What Was Accomplished*, 52 Am. J. Int'l Law 607-28 (1958); Friedheim, *The "Satisfied" and "Dissatisfied" States Negotiate International Law*, 18 World Pol. 20-41 (1965); Whiteman, *Conference on the Law of the Sea: Convention on the Continental Shelf*, 52 Am. J. Int'l Law 629-59 (1958).

In the three international conferences under consideration, the issues of determining the limit of the territorial sea and the extent of fishing rights in the contiguous zone became the focal points around which highly disruptive conflict revolved, and in none of them was it possible to arrive at agreement. In at least two of these three conferences, these two issues were regarded as the crux of the whole undertaking of the codification of the law of the sea.[8] This is a vivid example of a situation in which no solution appeared to be a better alternative than a solution which ignored the claims of any of the competing groups, most of whom rigidly adhered to their initial positions.

Claims made with regard to desired limits of the territorial sea were almost identical under both the League and United Nations conferences. Although some participants shifted their positions over time, the limits suggested under the League were the same as those proposed under the United Nations, with the exception of claims to prescribe and apply authority over an area extending 200 miles from the coastline made by certain Latin American states after 1945. Also, under the League, the debates tended to be conducted in much more doctrinal terms than under the United Nations, with the result that the interests which lay behind these claims were often obscured.

A. *The Hague Conference of 1930*

At The Hague Conference of 1930, both the United Kingdom and the United States, *inter alia,* firmly adhered to a 3-mile limit as being most efficacious in preserving the historic freedom of the seas.[9] This was, in fact, the majority position to which other nations submitted alternatives.

The most extreme claim which confronted adherents of the 3-mile limit was Spain's initial proposal that each country be allowed unilaterally to fix the breadth of its own territorial sea.[10]

---

[8] Statement of the representative of Saudi Arabia at the 2nd Conference sponsored by the U.N.: U.N., SECOND UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA, Official Records, Summary Records of Meetings of the Committee of the Whole, March 17-April 26, 1960, A/CONF.19/8, at 37 [Hereinafter cited as U.N. 2ND SEA CONFERENCE]. *See also,* the statement of the Chairman of the 2nd Committee on Territorial Waters at The Hague Codification Conference of 1930, LEAGUE, PUBLICATIONS: LEGAL, V, 1930, 2nd Committee, Doc. C.351(b).M.145(b). V, at 119 (1930).

[9] U.N. 2ND SEA CONFERENCE, *supra* note 8, at 17-18, 20.

[10] *Id.* at 28.

TABLE 1

State Policies Towards the Breadth of the Territorial Sea Before The Hague Codification Conference of 1930[11]

3-mile limit	4-mile limit	6-mile limit	12-mile limit	18-mile limit	Unilateral delimitation
Australia	Norway	Finland	—	Portugal	Spain
Denmark	Sweden	Italy			
Egypt					
Estonia					
France					
Germany					
India					
Japan					
Latvia					
Netherlands					
New Zealand					
Poland					
Romania					
Union of South Africa					
United Kingdom					
United States					
(Total – 16)	(Total – 2)	(Total – 2)	(Total – 0)	(Total – 1)	(Total – 1)

In descending order of exclusiveness, Portugal claimed a 12-mile limit, and in the explanation of her position we have a condensed version of the entire conflict over the delimitation of the territorial sea in both the League of Nations and the United Nations. Since Portuguese fishing sites extended in the relatively shallow water around her coasts for approximately 12 miles, said the Portuguese delegate, and since the Portuguese population was considerably dependent upon the fishing yield for a substantial part of its diet, Portugal could not agree to any limit which would deprive her of satisfying this essential interest.[12] If, however, most states were opposed to a 12-mile limit, Portugal was prepared to agree to a 6-mile limit and a contiguous zone of a further 6 miles in which her comprehensive and continuing exclusive jurisdiction and control over fishing rights would be acknowledged.[13]

The primary interest with which all states were concerned involved the competence to extend or prescribe authority over *fishing* in certain waters adjacent to their coasts and beyond. Thus, by as early as 1930, the terms of a debate which was to occur many times were firmly established. The confrontation was one between those states like Great Britain, the United States, and Japan which had the capability and need for engaging in distant-water fishing and those states possessing the need but not the capability for doing so. In the latters' eyes, therefore, it was essential to gain exclusive control over as wide an area of the sea adjacent to their coasts as was

[11] Complied from, LEAGUE, PUBLICATIONS: LEGAL, V, BASES OF DISCUSSIONS: TERRITORIAL WATERS, Doc. C.74, M.39, at 22-32 (1929).

[12] *Id.* at 18.

[13] *Id.*

possible; their attempts to do so were encroachments upon the distant-water fishing interests of the larger nation-states.

After days of arguing, the original positions of states were virtually unchanged and no agreement was in sight.[14] The Hague Conference was unable to agree upon an International Convention regulating the limits of the territorial sea. As one Committee Chairman put it: "There is an atmosphere of resignation in the Committee. We have to acknowledge to our regret that agreement is not possible on the question of the breadth of territorial waters."[15]

TABLE 2

State Policies Towards the Breadth of the Territorial Sea at the End of the Conference[16]

3-mile limit	4-mile limit	6-mile limit	12-mile limit	18-mile limit	Unilateral delimitation
Australia	Finland	Chile	Portugal	–	–
Belgium	Iceland	Colombia			
Brazil	Norway	Cuba			
Canada	Sweden	Italy			
China		Persia			
Denmark		Romania			
Egypt		Spain			
Estonia		Turkey			
France		Uruguay			
Germany		Yugoslavia			
Greece					
India					
Irish Free State					
Japan					
Netherlands					
Poland					
Union of South Africa					
United Kingdom					
United States					
(Total – 19)	(Total – 4)	(Total – 10)	(Total – 1)	(Total – 0)	(Total – 0)

B. *First United Nations Conference of 1958*

As indicated, there was very little difference in substance between confrontations over delimitation of the territorial sea under the League and confrontations under the United Nations. The international conferences sponsored by the United Nations did, however, manage to reveal exactly those interests that lay behind various positions. That these were much the same as those existing in 1930 was testified to by the delegate from Jordan in the First Committee of the United Nations Conference on the Law of the Sea.[17]

[14] *Id.* at 123-26.

[15] *Id.* at 160.

[16] Compiled from, LEAGUE, PUBLICATIONS: LEGAL, V, 2nd Committee, Territorial Waters, Doc. C. 351(c).M.145(c) (1930).

[17] U.N. CONFERENCE ON THE LAW OF THE SEA, Geneva, Feb. 24-Apr. 27, 1958. Summary Records of the Meetings of the First Committee (The Territorial Sea and the Contiguous Zone), A/CONF. 13/39, at 18 (1958) [hereinafter cited as U.N. SEA CONFERENCE].

Summing up the conflict taking place in the First Committee over the issue of the breadth of the territorial sea, it appeared to the Jordanian delegate that the problem occurred as a result of divergent views adopted by the great maritime powers, on the one hand, who called for a decision on the basis of 3 miles, and the smaller nations, on the other hand, who urged that a limit of 12 miles or more be established. The bases of these divergent views, he thought, were to be attributed to the fact that a strict interpretation of the freedom of the seas would work to the advantage of the larger maritime states while an extension of the area in which smaller states could exercise comprehensive and continuing exclusive jurisdiction and control would serve their interests — which were partially dictated by their concern with defense.[18] The concern with defense may have been of paramount importance for the State of Jordan, given the prolonged condition of hostility existing between the Arab States of the Middle East and Israel. For the rest of those states opposing the establishment of a 3-mile limit, however, the uppermost concern remained with fishing rights.

The United Kingdom, supported by the Netherlands, Canada, and France, continued to adhere to a 3-mile limit as the one which had gained the widest historical acceptance and practical application.[19] Being a little more specific, the United States claimed that a 3-mile limit was the safest for shipping and was the most equitable limit possible for all states.[20] Furthermore, a 3-mile limit, if generally recognized, would serve to secure fisheries, a source of food for all the world, from further encroachment of the coastal state.[21] This claim was strongly supported by Japan, which depended on the sea for 90 percent of her animal protein.[22]

Of those states who lobbied for a 3-mile limit, Canada was among the first to offer a compromise — the establishment of a 3-mile territorial limit, with a 12-mile contiguous zone for fishing.[23] Now forced into specificity, the United Kingdom replied that its own economic interests could not admit to such an extension.[24]

The most extreme claims were those proposed by Peru, Chile, Costa Rica, and El Salvador, all of whom demanded general recog-

---

[18] *Id.*

[19] *Id.* at 8, 11, 19.

[20] *Id.* at 25-26.

[21] *Id.*

[22] *Id.* at 24-25.

[23] *Id.* at 90. The phrase "territorial limits" meant those waters subject to a comprehensive and continuing exclusive jurisdiction and control — *i.e.*, subject to the absolute sovereignty of the adjacent nation. The phrase "contiguous zone" meant those waters beyond the territorial limits over which the adjacent nation would be awarded specified competences by international agreement to occasionally exercise jurisdiction and control with regard to certain particular interests within the zone.

[24] *Id.* at 104.

nition of the extension of their territorial sea to *200* miles in order "to protect the living resources of the sea from excessive exploitation by foreign fishing fleets."[25] Both Burma and Indonesia called for the establishment of varying breadths based on the "economic, geographical, biological, technological, political, and defense needs of the state concerned."[26] The foregoing positions, and others, are summarized in Table 3.

In the light of these diverse positions, each supported so rigidly by its own faction, it is not surprising that effective compromise proved elusive. In addition, voting tended to be in blocs composed on the basis of interests and/or geographical location, and all proposals which were offered failed to command a consensus, no matter how many conciliations were made.

C. *Second United Nations Conference of 1960*

The Second United Nations Conference on the Law of the Sea in 1960 was essentially a continuation of the first, and the attending nations continued to build upon proposals submitted during the previous conference in an attempt to reach the two-thirds majority required for agreement. In another attempt at the reconciliation of competing interests, the United States reintroduced a proposal in which the maximum limit of the territorial sea was to be 6 miles with a contiguous zone for fishing extending for another 6 miles.[28] In addition, foreign fishermen who had been accustomed to fish in this contiguous 6-mile zone before January 1, 1958 (the base period), would be allowed to fish for the same yield of the same groups of species.[29] The United States delegate also explicity recognized that this proposal did not provide for those special situations in which the coastal state was particularly dependent upon fishing but where it did not possess the technical capability to fish beyond coastal waters. On this point, however, the United States was prepared to extend sympathetic and careful consideration.[30]

The United Kingdom, with great reluctance, supported this proposal which would involve a "heavy sacrifice" for her fishing interests.[31] But the Yugoslav delegate severely attacked the provision securing the rights of foreign fishermen as a poorly conceived effort to uphold acquired rights which were nothing but "vestiges

---

[25] *Id.* at 33; *see also* 6, 48.

[26] U.N. SEA CONFERENCE, *supra* note 17, at 4, 14.

[27] U.N. 2ND SEA CONFERENCE, *supra* note 8, at 158-63.

[28] U.N. 2ND SEA CONFERENCE, *supra* note 8, at 45-46.

[29] *Id.*

[30] *Id.*

[31] *Id.* at 55.

TABLE 3

State Policies Towards the Breadth of the Territorial Sea, 1960[27]

3-mile limit	4-mile limit	5-mile limit	6-mile limit	9-mile limit	10-mile limit	12-mile limit	200-mile limit
Argentina	Finland	Cambodia	Ceylon	Mexico	Albania	Bulgaria	Chile
Australia	Norway		Colombia			Ecuador	Costa Rica
Belgium	Sweden		Greece			Ethiopia	El Salvador
Brazil			India			Guatemala	Peru
Canada			Israel			Indonesia	
China (Rep. of)			Italy			Iran	
Cuba			Spain			Libya	
Denmark			Thailand			Panama	
Dominican Rep.			Uruguay			Romania	
Fed. of Malaya			Yugoslavia			Saudi Arabia	
France						UAR	
Ireland						USSR	
Japan						Venezuela	
Jordan							
Liberia							
Netherlands							
Pakistan							
Poland							
Tunisia							
Union of South Africa							
United Kingdom							
United States							
(Total – 22)	(Total – 3)	(Total – 1)	(Total – 10)	(Total – 1)	(Total – 1)	(Total – 13)	(Total – 4)

of colonialism."[32] Canada was again opposed to this provision but this time was prepared to compromise if the United States placed a 5-year limit on the preceding base period and a 10-year limit on the exercise of these benefits by foreign fishermen from October 31, 1960. This having been done, the proposal was jointly sponsored by the United States and Canada.[33] Because of this amendment, though, the proposal was unpalatable to the United Kingdom, to whom the time periods were too short and the costs too great.[34] But she still voted for it in Plenary Session, at which time the vote was 54 in favor, 28 opposed, with five abstentions.[35] It was not adopted, however, as it was one vote short of the required two-thirds majority. Consequently, no norm regulating the breadth of the territorial sea was included in the results of either convention.

Only a few of the significant positions, proposals, and votes on this issue are described above. However, Robert Friedheim has factor analyzed all 78 votes — 67 substantive and 11 procedural — taken during the 1958 and 1960 Geneva Conferences in order to determine the underlying issues of conflict in voting behavior.[36] His results are compatible with the statements made heretofore.[37]

III. OVERVIEW OF OUR CURRENT SITUATION

Given this background, what trends are now evident on issues concerning the territorial sea, contiguous zone, and jurisdiction over fisheries?

At the end of the long discussions on the problem of the territorial sea in the International Law Commission, there was neither

---

[32] *Id.* at 70.

[33] *Id.* at 121.

[34] *Id.* at 126-27.

[35] *Id.* at 30.

[36] Friedheim, *Factor Analysis as a Tool in Studying the Law of the Sea,* in ALEXANDER (1967), at 47-70.

[37] *Id.* at 57. Friedheim claims that combining proposals on the breadth of the territorial sea with proposals on a contiguous zone probably explained the failure to reach any acceptable compromise. As mentioned earlier, *supra* note 23, the contiguous zone was an area beyond the territorial limits over which the adjacent nation would be awarded specified competences to exercise a limited jurisdiction with regard to particular interests. Conflict regarding the contiguous zone revolved around what specified competences were to be awarded the coastal state, the legal significance of such competence, and the manner in which its enforcement was to be accomplished. *See e.g.,* LEAGUE, PUBLICATIONS: LEGAL, V, 2d Committee, at 31, (1930).

For example, although it was generally agreed that a state could exercise occasional jurisdiction in the contiguous zone in regard to fiscal, sanitary, and customs interests (A/CN.4/Ser. A/1956/Add. 1, 2 ILC YEARBOOK, 1956, at 264 (1956)) a dispute arose at the first United Nations Conference as to whether or not a coastal state should be allowed to exercise jurisdiction and control within the contiguous zone on the basis of security interests. U.N. SEA CONFERENCE, 1st Committee, at 107, 181. *See also,* criticisms of the International Law Commission's recommendations and the decisions of the 2nd U.N. Conference in MCDOUGAL & BURKE, *supra* note 1, at 76, 604-07.

a single point of view nor a concrete proposal which had gained general acceptance. In the face of hopeless deadlock, therefore, by the significant vote of 7 to 6, the ILC passed the problem on to the future international conference in the following way:

1. The Commission recognizes that international practice is not uniform as regards the traditional limitation of the territorial sea to three miles.
2. The Commission considers that international law does not justify an extension of the territorial sea beyond twelve miles.
3. The Commission, without taking any decisions as to the breadth of the territorial sea within that limit, considers that international law does not require States to recognize a breadth beyond three miles.[38]

Somewhat ironically, in spite of (or perhaps as a result of), the conflict generated in 1958 and 1960, this is about where we stand. Even at the end of the 1930 Conference the traditional 3-mile limit still represented the majority position, although the 6-mile limit had increased its supporters from two to 10. By 1960, however, the 3-mile position had declined from a majority to a plurality, the 10-mile position had remained steady but was superseded by the 12-mile position which now had 13 adherents. In fact, a majority of states (33) supported positions which called for limits greater than 3 miles. If they did nothing else, therefore, the 1958 and 1960 Conferences definitely undermined the supremacy of the traditional restrictive 3-mile limit and the lesser developed states did much to achieve this.

As of 1967, the situation, based on data provided by Professor Lewis Alexander, looks like this:

TABLE 4

Frequency Distribution of Current Limits to the Territorial Sea[39]

Limit	Number of Countries	Limit	Number of Countries
3 miles	32	12 miles	26
4 "	3	50 Km.	1
5 "	1	130 miles	1
6 "	16	200 "	1
12 Km.	1	None specified	7
9 miles	1	No information	15
10 "	2	Landlocked countries	28

Although the distribution is considerably affected by the comprehensiveness of the data, the major clusters are still around the 3, 6, and 12-mile limits. However, at least 50 percent of all countries with a seacoast now have limits beyond 3 miles. The figure is higher than that if we realize that states like Costa Rica, Iceland, Peru,

[38] A/CN.4/Ser. A/1955 Add 1, 2 ILC YEARBOOK, 1955, at 35.

[39] Alexander, *Offshore Claims of the World,* ALEXANDER (1967), Table 3, at 72-75.

and South Korea who report no specified limit certainly are not stout defenders of the traditional norm. On the other hand, there are only three countries who claim limits beyond 12 miles, and so we are back to the ILC's conclusion.

While the evidence suggests that exclusive claims on the territorial sea may have stabilized around the 12-mile limit as maximum, it is not entirely clear that claims concerning fishery jurisdiction have also stabilized, even though zones up to 12 miles now represent the majority (55 out of 86) position.[40]

There is another irony about all this — fish do not breed and live according to rigidly defined constructs like contiguous zones, nor is a territorial sea of 12 miles any more effective for security reasons than one of 3 miles.[41] As McDougal and Burke so aptly point out, the spatial variable per se is not crucial and, indeed, is often misleading. Rather, "what is important for policy is not mere distance but the concentration of activities and interests being located."[42]

If we were to contrast the distinctive features of the 1958 and 1960 Geneva Conferences with those of The Hague Conference of 1930, the major differences would have to be phrased in terms of the primacy of the East-West confrontation in the post World War II era, the rate of technological advance and the expectations that are generated as a result, and the role played by the smaller, lesser developed participants in shaping the outcomes of the last two conferences. One of the other striking differences to be observed would be in the whole issue of the continental shelf which did not even exist as far as The Hague Conference was concerned.

It was not until 1942 that the first treaty demarcating relative jurisdictions over the shelf in the Gulf of Paria was signed between Britain and Venezuela, and it was not until 1945 that the United States issued its proclamation claiming jurisdiction over the shelf surrounding the United States.[43] This was followed by an Argentinean claim which included the superjacent waters, with the United States denying the validity of the latter ingredient.

The problem of defining the limits of the shelf is difficult because the concept refers to the subsoil extending from the coast of a state out under the sea and the geologic diversity which exists makes any limit defined in terms of depth an artificial one. This is

---

[40] Neblett, *The 1968 Conference on the Law of the Sea: What Was Accomplished,* ALEXANDER (1967), Table 1, at 42.

[41] McDougal, *International Law and the Law of the Sea,* ALEXANDER (1967), at 20.

[42] MCDOUGAL & BURKE, *supra* note 1, at 9, n. 25.

[43] For the relevant documents, see H. BRIGGS, THE LAW OF NATIONS 377-85 (2d ed. 1952). For a more conprehensive history see Moutan, *The Continental Shelf,* 85 RECUEIL DES COURS 347-463 (1954).

so even though UNESCO claimed in 1957 that the continental shelf had a remarkably uniform marginal depth of 100 to 150 meters.[44]

Prior to 1945, the shelf was important primarily for coastal fisheries, both pelagic and sedentary, because the water is sufficiently shallow to allow considerable photosynthetic activity which leads to the creation of rather large fisheries.[45] In addition, there was some coal mining, but it was the coming of off-shore oil drilling operations that led to the new significance attached to this area. As a result, the continental shelf became a major issue about which most controversy turned in the ILC's preparatory work on the law of the sea.

As the Commission stated in its commentary, the debate over definitions of the continental shelf was a long (and at times confusing) one.[46] Several times the Commission wavered between adopting the criterion of exploitability to define the limits of the shelf and adopting a precise limit based on the depth of the superjacent ocean, *i.e.*, up to 200 meters. In the end, the Commission included both criteria.[47]

During the discussion on the legal status of the shelf, Mr. Ivan Kerno, representative of the Secretary-General to the ILC, stated that whatever the Commission decided about the continental shelf, explicit mention should be made of the status of its superjacent waters.[48]

He suggested that although it was necessary for the ILC to make specific the depth and distance up to which rights of jurisdiction and control could be exercised by the coastal state, these limits should be supplemented by a provision designed to maintain the flexibility of the norm vis-a-vis continued advances in techniques of exploitation. In other words, both a fixed limit *and* the exploitability criterion should be employed. There appeared, at no time,

---

[44] UNESCO, SCIENTIFIC CONSIDERATIONS RELATING TO THE CONTINENTAL SHELF, in U.N. SEA CONFERENCE: PREPARATORY DOCUMENTS, Doc. A/CONF. 13/2/Add. 1, at 39-46 (1957). For a more recent analysis which differs considerably from UNESCO's, see Emery, *Geological Aspects of Sea-Floor Sovereignty,* in ALEXANDER (1967), at 139-59.

[45] Chapman, *Fishery Resources in Offshore Waters,* in ALEXANDER (1967), at 87-105. *See also* FAO, *Examination of Living Resources Associated with the Sea Bed of the Continental Shelf with Regard to the Nature and Degree of their Physical and Biological Association with Such Sea Bed* in U.N. SEA CONFERENCE: PREPARATORY DOCUMENTS, Doc. A/CONF. 13/13, at 187-97 (1957).

[46] 2 ILC YEARBOOKS, 1956, at 296-97.

[47] Article 67 reads:

> For the purposes of these articles, the term "continental shelf" is used as referring to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres (approximately 100 fathoms) or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.

A/CN.4/Ser. A/1956/Add. 1, at 296.

[48] U.N. Doc's A/CN.4/Ser. A/1950, 1 ILC YEARBOOK, 1950, at 228.

to have been any consideration of the probable incompatibility of these two criteria in practice, especially in terms of the conflict which might be generated between those states which could sponsor and employ advances in techniques of exploitation as opposed to those which could not. Prior to the 1958 Conference, UNESCO had prepared a working paper on this question which specifically pointed out the incompatibility of a combined bathymetric/exploitability limit, but there is no indication that this warning was heeded in the debates.

The solution which was finally adopted during the actual conference was that a clause be inserted in the article defining the shelf, and stipulating that no state could exploit the seabed and subsoil off the coast of another without its express consent.[49] With this sole addition, the conference accepted the recommendation of the Commission, which was a compromise on the lowest common denominator — words rather than substantive issues.

The problem which now confronts us is that it has become technologically possible to drill for oil and other minerals far beyond the 200-meter isobath, leaving the limit on the shelf rather open-ended. In addition, mineral exploitation has significant impacts on other uses of the ocean — fishing, navigation, and security — and these conflicting uses must be reconciled. I will return to current attempts to deal with expanding national jurisdiction over the oceans after I survey some of the more important technological innovations in ocean exploitation.

IV. RECENT INNOVATIONS IN MARINE TECHNOLOGY AND THEIR IMPACTS ON THE INTERNATIONAL USE OF THE OCEANS

In this section a number of innovations will be cataloged, current and predicted, which were pinpointed at the first Mershon Conference on Law, Organization, and Security in the Use of the Oceans.[50] These innovations will be put into the following categories: fishing, drilling and mining, military uses, and weather prediction and control.[51] Although these have to be separated for purposes of analysis, I do not wish to leave the reader with the misleading

[49] U.N. SEA CONFERENCE, 4th Committee, A/CONF. 13/42, at 43 (1957).

[50] Held at Columbus, Ohio, Ohio State University, March 17-18, 1967.

[51] For other summaries, see, Abel & Sullivan, *Trends in Marine Sciences,* in ALEXANDER (1967), at 42; W. BURKE, OCEAN SCIENCES, TECHNOLOGY, AND THE FUTURE INTERNATIONAL LAW OF THE SEA (1966); Burke, *Law and the New Technologies,* in ALEXANDER (1967), at 204; MacDonald, *What's in the Ocean,* 64 INT'L SCI. & TECH. 38 (1967); J. Craven, Technology and the Law of the Sea, Mar. 17, 1967 (unpublished paper presented to the first Mershon Conference on Law, Organization, and Security in the Use of the Oceans, Mar. 17-18, 1967, at Ohio State University, Columbus, Ohio) [hereinafter cited as 1st Mershon Conference]; J. Knauss, Problems in Oceanography — 1977, Mar. 17, 1967 (unpublished paper presented to the first Mershon Conference).

impression that each category can actually be dealt with in isolation. The ocean is a single system in which all technologies have multiple impacts, compatible and incompatible, on other uses and users. Two generalizations can be made which should be kept in mind at all times but which are rarely underscored in the popular literature. These are:

(a) That technological advance per se is inherently unlimited; but

(b) That the widespread utilization of new technologies will be determined, in broad terms, by the rate of return for industry and by cost/benefit ratios for governments.

A. *Innovations in Fishing*[52]

One built-in uncertainty about this problem is that we do not know what major technological breakthroughs are likely, but Kasahara suggests that research ought to be channeled primarily into two major fields. These are: "the utilization of marine animals (including zooplankton) at lower trophic levels; and the possibility of changing oceanographic conditions to increase primary productivity."[53] Similarly, it is fair to say that, apart from normal improvements in gear, boats, the composition and capability of fleets, etc., most recent innovations reflect to varying degrees the concern with moving from fishing as hunting to more efficient and controlled systems of husbandry.[54]

More specifically, these innovations have been directed toward such activities as farming both crustacea and pelagic species in bays, estuaries, and other enclosed places, herding fish in the open sea by using electric fields or trained porpoises, harvesting krill in the antarctic, manipulating the ecosystem of certain portions of the ocean to increase productivity by inducing artificial upwelling, and developing marine protein concentrate for human consumption.[55] Until these become effective methods of "aquaculture," Gemini photographs have shown that it is possible to use orbiting satellites

[52] This section is based primarily on the following unpublished works from the 1st Mershon Conference: W. Chapman, Food Production from the Sea and the Nutritional Requirements of the World; H. Kasahara, Food Production from the Ocean; D. Moore, Developing Fishing Technology and the Future Law of the Sea; M. Schaefer, Some Comments on Interaction between the Exploitation of the Food Resources and Other Uses of the Ocean.

[53] H. Kasahara, *supra* note 52, at 17.

[54] Proceedings of the 1st Mershon Conference, at A6-A7 (privately distributed publication); *see also,* Isaacs, *Food From the Sea,* 64 INT'L SCI. & TECH. 61 (1967).

[55] *See,* E. Miles, Some Socio-Cultural Problems Involved in Expanding Use of Marine Protein Concentrate for Human Consumption, Oct. 5, 1967 (unpublished paper presented to the Second Mershon Conference on Law, Organization, and Security in the Use of the Oceans, Oct. 5-7, 1967, at Ohio State University, Columbus, Ohio) [hereinafter cited as 2nd Mershon Conference].

to detect large schools of fish and thereby to aid fishermen in their search.[56]

It has been suggested that sedentary fish farming and the harvesting of pelagic species on the continental shelf have been greatly facilitated by another major technological innovation — saturation diving.[57] But so far fish farming on a large scale is an enormously expensive activity and is therefore not likely to be widely employed. The difficulties of farming in the open ocean are still considerable, and it is not at all clear that the harvesting of zooplankton will in the long run generate sufficient pay-off. The most promising of the innovations cataloged here is thought to be inducing artificial upwelling by nuclear energy, and it is estimated that the cost/benefit ratios will become more favorable as the cost of producing nuclear energy decreases.[58]

B. *Innovations in Drilling and Mining*

I will not detail here specific innovations in ocean drilling and mining activities.[59] I need only point out that the thrust of all these innovations is to provide the petroleum and mining industries with a greater mobility and an enlarged capability for operating at greater depths of the ocean in their search for new raw materials and new energy reserves. As one expert put it: "I believe that in the future, semisubmersibles and the self-powered floaters will be committed to ever-increasing water depths. The ultimate design objective for a drilling unit is depicted as a totally automatic, submarine unit, whose principal function will be unaffected by environmental forces."[60]

We should realize, also, that these developments will have several side-effects among which will be an increase in the difficulty of controlling oil and other pollution of the ocean. The emergence of the supertanker has presented us with this problem in a magnitude

---

[56] *See,* W. Chapman, Implications of Space Research to Fishery Development, Apr. 7, 1967 (Unpublished paper presented to the Symposium on the Ocean from Space conducted by the American Society for Oceanography in Houston, Texas, Apr. 7, 1967).

[57] *See,* J. Craven, *supra* note 51, at 24-25; Clarke, Flechsig & Grigg, *Ecological Studies During Sealab II,* 157 SCIENCE 1381 (1967).

[58] Comment by Dr. M. B. Schaefer at the 1st Mershon Conference.

[59] *See* Brooks, *Deep Sea Manganese Nodules: From Scientific Phenomenon to World Resources* in THE FUTURE OF THE SEAS RESOURCES 32 (L. Alexander ed. 1968). Hibbard, *Offshore Petroleum and Natural Gas: A Marine Resource of Increasing Importance* in THE FUTURE OF THE SEAS RESOURCES 52 (L. Alexander ed. 1968); Mero, *Alternatives for Minteral Exploitation* in *id.* at 94; Walthier, *Remarks on the Mining of Deep Ocean Mineral Deposits* in *id.* at 98; Andel, *Deep-Sea Drilling for Scientific Purposes: A Decade of Dreams,* 160 SCIENCE 1419 (1968); Coene, Profile of Marine Resources, Mar. 17, 1967 (unpublished paper presented to the 1st Mershon Conference).

[60] Hibbard, *supra* note 59, at 53.

hitherto unexperienced.[61] Oil, as well as radioactive waste, will continue to pollute the oceans, while we are still largely ignorant of the effect of these on the ecosystem of the ocean.

C. *Innovations in Military Technology*

In the area of military technology we will continue to see improvements on Polaris-type systems, accelerating research to enhance a nation's anti-submarine warfare capability, improvements in propulsion, particularly with regard to making the fuel cell an economic alternative to nuclear power, and we are now at the point where the emplacement of missile silos on the ocean floor is technically feasible. But perhaps the most dramatic recent innovation is the deep submersible with its attendant improvements in the structure of hulls and command and control systems. As Dr. John Craven, Director of the United States Navy's Deep Submergence Systems Project, states: "[T]he projection of deep-ocean technology is such that in the period beyond 1980 we may expect a socially-significant proliferation of non-military submersibles and equipment of low-cost, capable of operating throughout the water column at/or on the bottom and capable of exploiting the sea bed or the resources of the sea bed."[62]

It is clear that these deep submersibles will be used for a wide range of military and nonmilitary purposes, from finding lost H-bombs and submarines, to conducting ocean science research, to carrying out exploration and exploitation of mineral and petroleum resources. They will be owned not only by governments but by private companies and individuals, and this will add a host of new complications to the use of the deep ocean and the sea bed. As far as the utility of these vessels for research is concerned, one expert has made the following observation:

> Without question the most valued feature of the submersible is that the observer can visit the site and make direct records of his observations. Examples of the work thus made possible are direct, prolonged observation of the behavior of marine organisms and of the fine variability in sediments; observation of sediment transport and features of deeply submerged canyons; observation of near bottom currents with dye; discovery of extensive terraces on the continental shelf; correlation of the biota with the nature of the bottom sediment; proof of the existence of life at the deepest known spot in the ocean; exploration of the bathymetry and biota

[61] *See* Nanda, *The "Torrey Canyon" Disaster: Some Legal Aspects*, 44 DENVER L. J. 400 (1967); Walsh, *Pollution: The Wake of the "Torrey Canyon,"* 160 SCIENCE 167 (1968).

[62] J. Craven, *supra* note 51; *see also* Craven, *Ocean Technology and Submarine Warfare*, 46 ADELPHI PAPERS 38-46 (1968); Craven, *Working in the Sea*, 64 INT'L SCI. & TECH. 50 (1967).

of Lake Michigan, revealing the existence of a mid-lake sill, glacial boulders, and snowlike precipitation.[63]

D. *Innovations in Weather Forecasting and Modification*

Technological innovations which affect weather research include the utilization of orbiting weather satellites (TIROS, ESSA, HIMBUS) and improvements in buoy and other sensor technology for data gathering purposes. The net result, therefore, is to permit a potentially global observation which was heretofore impossible.[64] Apart from this development, perhaps the greatest concern is being focused on patterns of ocean circulation and their relationship with the exchange of heat between the atmosphere and the oceans.[65] It appears that it is this relationship which is crucial for understanding and predicting weather patterns — and particularly for understanding the generation of large-scale weather disturbances like hurricanes and typhoons.[66]

The need for more knowledge in this area is necessary not only for improving forecasts, but it is also crucial to attempts to modify the weather in different ways; the most dramatic example of which may be the plans to seed hurricanes. The great problem here, however, relates to the uncertainty of the behavior of the hurricane after it is seeded and the probable damage to countries in its path with the possible subsequent liability of the country sponsoring the research. There is agreement among scientists that the experiments which are conducted should not lead to irreversible results.[67]

V. THE IMPACTS OF RECENT TECHNOLOGICAL INNOVATIONS ON THE LAW OF THE SEA

It is clear that the thrust of all trends and technological innovations discussed above has been to extend the jurisdiction of the coastal state beyond traditional limits and to stimulate increasing national claims for even greater exclusive controls. Some agreement has been made that this will facilitate the efficient exploitation of oil and gas and minerals given the need of these industries for long term security and predictability in their activities — a result of the magnitude of the investment required. But if one looks at the problem from a global perspective that includes other uses and users,

---

[63] Arnold, *Manned Submersibles for Research,* 158 SCIENCE 84-95 (1967).

[64] *See* THE NATIONAL COUNCIL ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT, UNITED STATES ACTIVITIES IN SPACECRAFT OCEANOGRAPHY, Oct. 1, 1967 (pamphlet).

[65] NAS/NRC, INTERACTION BETWEEN THE ATMOSPHERE AND THE OCEANS 1-4 (pub. No. 983, 1962).

[66] Miller, *Characteristics of Hurricanes,* 157 SCIENCE 1389-99 (1967).

[67] *See* the comments by Dr. Athelstan Spilhaus, at the 1st Mershon Conference, Vol. II, at D15-D19 (Mar. 17-18, 1967).

the attractiveness of this alternative declines.[68] States with major naval capabilities are not likely to find such carving up of the oceans very desirable.

Furthermore, the scientific research requirements of ocean exploration are such that only a coordinated, massive international effort will yield comprehensive results. It is for this reason that President Johnson's proposal for an international decade of ocean exploration was favorably received by the Soviet Union and other countries.[69]

Thus, recent technological innovations have succeeded in bringing questions of ocean policy to the forefront of current international political issues. These questions revolve mainly around the limits of the continental shelf and jurisdiction over the floor beyond the shelf. In other words, the major issues are who gets what, when, where, and how, and the conflicts generated thereby impinge upon the efficiency and feasibility of an international regulation system for fisheries, oil and gas, minerals, transportation and navigation, and security and recreation.[70]

Most recommendations which have been made fall into the four categories, succinctly characterized by Richard Young:

> (1) An extension of the shelf doctrine to all ocean areas, thereby effecting a division of the ocean floor among coastal states fronting on the ocean.
>
> (2) A revision of the occupation theory which would permit acquisitions by individual states, but which would establish by multilateral convention an international registration system for national claims, possibly along with some international controls and some provision for preventing or resolving conflicts.
>
> (3) A vesting of the deep-sea floor in some international agency, which would in effect act like a landlord in granting

[68] For excellent summaries of the major questions involved, see Christy and Brooks, *Shared Resources of the World Community,* in NEW DIMENSIONS FOR THE UNITED NATIONS: THE PROBLEMS OF THE NEXT DECADE (C. Eichelberger ed. 1966); Young, *The Legal Regime of the Deep-Sea Floor,* 62 AM. J. INT'L L. 641-53 (1968); *see also Hearings on Governing the Use of Ocean Space Before the Senate Committee on Foreign Relations,* 90th Cong., 1st Sess. (1967).

[69] N.Y. Times, June 18, 1968, at 23, col. 1.

[70] Full discussions of these questions may be found in: Christy, *The Distribution of the Seas' Wealth in Fisheries,* in THE LAW OF THE SEA, ALEXANDER (1967), at 106-21; F. CHRISTY & A. SCOTT, THE COMMON WEALTH IN OCEAN FISHERIES (1965); SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH OF THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, INTERNATIONAL OCEAN AFFAIRS: A SPECIAL REPORT (1967); THE FUTURE OF THE SEA'S RESOURCES (L. Alexander ed., 1968); Christy, *Economic Criteria for Rules Governing Exploitation of Deep Sea Minerals,* 2 INT'L LAWYER 224-42 (1968); W. Chapman, Problems of North Pacific and Atlantic Fisheries, May 10, 1967 (unpublished paper presented at the Annual Meeting, Fisheries Council of Canada, Montreal, Canada); D. Cheever, The Role of International Organizations in Ocean Development, Oct. 5, 1967 (unpublished paper presented to the 2d Mershon Conference); F. Christy, Realities of Ocean Resources, July 27, 1967 (unpublished paper presented to the Marine Frontiers Conference, University of Rhode Island, July 27-28, 1967); F. Christy, Alternative Regimes for the Minerals of the Sea Floor, June 8, 1967 (unpublished paper presented to the American Bar Association, National Institute on Marine Resources).

licenses, leases, or concessions to explore and exploit the mineral resources in specified areas.

(4) A vesting of the deep-sea floor in an international agency which would itself carry on exploration and exploitation activities.[71]

We should realize, however, that whatever resolutions are finally decided upon will have to accommodate the national security interests of all participants, particularly those with wide-ranging naval capabilities. It is clear that the United States Navy would prefer to place rather restrictive limits on the extent of exclusive national jurisdiction in the ocean,[72] and it is reasonable to assume that in the near future the Soviet Union may also adopt this position given the recent substantive inputs into the Soviet naval program and their increasing activity in the Mediterranean Sea and the Indian Ocean. Proposals, therefore, which look to the Antarctica and Outer Space arrangements as models for the ocean do not take sufficient account of the much different role of the oceans as a strategic military arena when compared with the other two.

As in the field of space exploration,[73] the smaller nations, especially the newly independent ones, have had and will continue to have a considerable role in reshaping the law of the sea. The fact that many of these are also coastal states gives further impetus to the current trend of the extension of national jurisdiction over the ocean. Therefore, future conflict over the exploitation of coastal fisheries, the continental shelf, and the deep ocean floor may be greater between those states on opposite sides of the capability dimension. It may be, too, that as the fruits of exploitation grow, the less capable will perceive the stakes as being so high that the incentive to go to war over alleged intrusions may be greater unless some apparatus exists which attempts to maximize the distribution of values for all participants. However, the recent United Nations efforts to regulate activities in the use of ocean space show promise toward establishing an international mechanism to encourage peaceful uses in this fertile area.[74]

---

[71] Young, *supra* note 68, at 647-48.

[72] *See* Michael, *Avoiding the Militarization of the Sea* in NEW DIMENSIONS FOR THE UNITED NATIONS: THE PROBLEMS OF THE NEXT DECADE, at 167 (C. Eichelberger ed., 1966); K. Frosch, Military Uses of the Ocean, 9 Oct. 5, 1967 (unpublished paper presented to the 2d Mershon Conference); L. Zeni, Defense Needs in Accomodations Among Ocean Users (unpublished paper presented to the Third Annual Law of the Sea Institute, 1968).

[73] *See* E. Miles, Development of Legal Regimes to Guide Space Exploration, Aug. 28, 1968 (unpublished paper presented to the American Institute of Aeronautics and Astronautics Conference on the Impact of Aerospace, Science and Technology on Law and Government, Washington, D.C., Aug. 28-30, 1968).

[74] For recent discussions, see Nanda, *Peaceful Uses of Ocean Space*, 9 VA. J. INT'L L. 000 (1969); Panel, *Whose Is the Bed of the Sea*, 62 PROC. AM. SOC'Y INT'L L. 214 (1968).